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## RESEARCH ARTICLE

## HOW TO DEVELOP INQUIRY BASED LEARNING MATERIAL

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**Abstract**

Nowadays, teaching learning process becomes more learner- centred. So, the present conditions demand such approaches which give the chances to students to experience, to investigate and at last produce their own products in the form of new or much developed concepts. Inquiry based teaching-learning is a part of constructivist approach. It facilitate learner to inquire, gather data and draw conclusions in their own way. In inquiry based teaching learning process, teacher acts as a facilitator who creates different learning situation and facilitate students to investigate and take different experiences. So, it is necessary that teacher should pre-plan all the teaching activities. This paper focuses on the procedure of developing inquiry based learning material (lesson plans) for a regular classroom in a simple and effective manner.

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**INTRODUCTION**

Present conditions of teaching learning process demands the learning atmosphere where students are as an active participant not a passive one. Therefore, the constructivist approaches are widely used in the classrooms. This word "constructivism" represent the way where students are intimately connected with experiences students are supposed to develop their own cognitive structures by investigating, taking own decisions, collaborating and using higher order of thinking abilities and their own creativeness. This approach encourages the students to learn by doing something. Students act as the receiver of information and produce outcomes in combination with his own information under his own condition. This process governed by the past experiences of students that provide essential base for the development of any concept. Inquiry based teaching is one of the different constructivist approach. It can be proved as a productive strategy for teaching science.

**1. INQUIRY BASED TEACHING LEARNING**

Inquiry based teaching learning encourages students with a chance to form knowledge, skills and investigating habits of mind that foster to deeper apprehension of their world and human experience. Inquiry based teaching learning has to be appreciated because it is necessary as a tool for developing systemic, systematic and critical thinking skills, problem solving capabilities and the creativity of students.

Inquiry builds on students' inherent sense of curiosity and wonder, drawing on their diverse backgrounds, interests and experiences. The process provides opportunity for students to become active participants in a collaborative search for meaning and understanding (Brockman et al ,2009). Inquiry based teaching learning have five steps in its process-

- a) Familiarizing to content
- b) Formulate hypothesis
- c) Exposition ( It include five components viz. Ask, investigate, create, discuss, reflect)
- d) Explanation

- e) Evaluation

## 2. DEVELOPMENT OF LEARNING MATERIAL

The encyclopedia international (1979) define teaching as “the art of informing or instructing or providing guidance, suggesting activities and supplying material to stimulate learning. The actual process of teaching therefore is the transmission of what is to be learned by teacher to learner in a manner that will enable the learner to develop the necessary skills for the understanding and utilization of what is to be learned [2]. But teachers are reserved to the more effective activities based teaching methods and prefer methods that are easy and simple and sometimes these methods are inadequate and inappropriate. So, it is necessary to develop activity based learning material that are not too complex and time consuming. The three main steps are followed while developing an Inquiry based lesson plan-

- A. **Content analysis-** Select a class or grade and analyze the content of the prescribed textbook of that class.
- B. **Selection of content-** Select the appropriate content from the prescribed textbook with due consideration to the applicability of the inquiry based teaching learning approach.
- C. **Development of inquiry based lesson plan-** There are many lesson plan formats are available on web and the lesson plan format of inquiry based learning (mentioned below) can also be used as a reference lesson plan format for developing learning material and it would be proved appropriate for regular classroom.

### I. REFERENCE LESSON PLAN FORMAT

- i. **General entries:** (teacher name, course name, duration of lecture, Unit title, Chapter name)
- ii. **Instructional aims:** (final upshot that pupils should achieve on completion of the total unit of instruction)
- iii. **Expected behavioral changes:** (tact defined as behavioral objective-action verb that is assessable)
- iv. **Validation:** (brief explanation of why we think the pupils need to learn this topic)
- v. **Teaching point:** (what is to be taught?)
- vi. **Instructional Plan-**
  - a) **Engaging event:** (something to catch the pupils’ attention)
  - b) **Generating Hypothesis:** (expected results)
  - c) **Teaching strategies:** (actions we shall use)
  - d) **Formative check:** (progress checks throughout the lesson)
  - e) **Pupils’ engagement:** (how shall we get the pupils to take part)
  - f) **Summary:** (how shall we finish the lesson)
- vii. **Evaluation trials:** (how shall we determine if the material has been learned)
- viii. **Instructional aids and materials:** (which material shall we require in order to teach this lesson)

### II. DEVELOPED LESSON PLAN

**Teacher name-** Kratika Kumari

**Course name-** Science

**Duration of lecture** – 45 Minutes

**Unit title-** Sound production and its propagation

**Chapter name-** Sound production

- i. **Instructional Aims:**
  - To make students able to acquire knowledge through inquiry.

- To create interest in students towards the knowledge about sound production and its propagation.
- To develop reasoning ability in students.
- To develop scientific attitude in students.
- To develop experimental ability in students.

**ii. Expected behavioral changes:**

- Students will understand the concept of sound production.
- Students will be able to define different sources of sound production.
- Students will be interested to do experiments.
- Students will be able to observe an object with scientific interest.
- Students will be able to work within a group.

**iii. Validation:**

Sound plays an important role in our lives. It helps us to communicate with one another. Therefore, it is necessary for students to know about what is sound? And how does it produced?

**iv. Teaching points:**

- Sound produced by vibrating body
- Sound produced by human

**v. Instructional plan:**

**A) Sound produced by vibrating body-**

**a) Engaging event:**

Touch a simple bell when not in use; again touch it when producing sound. Teacher will ask to students what do you feel?

**b) Generating Hypothesis:** There will be produced different sounds from different vibrating bodies.

**c) Teaching tactics:**

- Teacher will strike a pan with wood hammer.
- Teacher will give opportunity to students to pluck the rubber band which is placed on a slide.
- Teacher will demonstrate the vibrating dish produces waves in water.
- Teacher will demonstrate some musical instruments like manjeera, flute produce vibration and sound.
- Teacher will demonstrate an experiment of jaltarang.

**d) Formative check:**

- When you touch the bell 'Do you feel any vibration?'
- After striking bell and holding plate tightly. Do you feel or hear any sound? or Do you feel any vibration?
- When you pluck rubber band, Do you feel vibration and sound?
- When we strike a dish filled with water, do you see any waves there?
- After holding the dish. What changes do you feel observe on the surface of water?
- Is there a hint to connect sound with the vibrations of a body?

**e) Pupils' engagement:**

Students can actively participate in all the activities and can learn through learning by doing.

**f) Summary:**

Teacher will explain the concepts-

Forward and back and forth motion of an object is called 'vibration'. When, a tightly stretched band is plucked. It vibrates and produces sound. when it stops vibrating. It does not produce any sound. In some cases, the vibrations are easily visible to us. But in most cases, their amplitude is so small that we cannot see them.

**B) Sound produced by human-****a) Engaging event:**

Teacher will recall about the vibration and say to students whenever you speak loudly for a while or sing a song, do you feel any vibration?

**b) Generating hypothesis:** There will be an impact of vibrations produced in throat on voice type of human.

**c) Teaching Tactics:**

- Teacher will demonstrate the working of vocal cords with the help of rubber strips and paper.
- Teacher will demonstrate voice box in human with the help of power point presentation.

**d) Formative check:**

- Do you feel any vibration? When blow between the rubber strips?
- Do you hear any sound when blow through paper and do you feel any vibration?

**e) Pupils' engagement:**

Students can actively participate in all activities and can learn through learning by doing.

**f) Summary:**

Teacher will explain-

In humans, the sound is produced by the voice box or larynx. It is the upper part of the windpipe. Two vocal cords are stretched across the voice box in such a way that it leaves a narrow slit between them for the passage of air. When the lungs force air through the slit, the vocal cords vibrate, producing sound. When the vocal cords are tight or thin, the type or quality of voice is different from that when muscles are loose and thick.

**vi. Evaluation trials-**

Teacher will ask to students-

- When voice has minimum frequency?
- What is amplitude?
- What is vocal cord?
- What is larynx?
- What is wind pipe?
- What is the role of muscles in determining voice quality?

**vii. Instructional aids and Materials:**

Manjeera, paper, rubber strip, Glass, water, pan, wood hammer, rubber, slide, dish etc.

**REFERENCES**

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